Microbiology (Bio 206) #22:
Immune Problems and Immunization

Terms you should know:
- delayed hypersensitivity
- immunodeficiency
- killed vaccine
- contact hypersensitivity
- SCID
- toxoid vaccine
- transplant rejection
- vaccination (immunization)
- DNA vaccine
cyclosporine
- live, attenuated vaccine

Questions you should be able to answer:
- How is type IV hypersensitivity different from other hypersensitivities?
- What are some common problems that are caused by type IV hypersensitivity?
- When a transplant donor and recipient are “matched,” what are we looking for?
- What are two causes for immunodeficiency?
- What are the two requirements for a useful vaccine?
- What are the advantages and disadvantages of attenuated, killed and toxoid vaccines?

Lecture outline:

I. Problems with the immune system (cont’d):
   A. Type IV hypersensitivity
      1. Contact hypersensitivity (poison ivy, skin allergies, etc.)
      2. Tuberculosis testing
      3. Transplant rejection
   B. Immunodeficiencies
      1. Genetic (such as SCID)
      2. Acquired (due to diseases such as AIDS or leukemia)

II. Immunization (vaccination):
   A. Stimulate a primary response against a pathogen without getting the disease
   B. Edward Jenner developed vaccination against smallpox
      1. Vaccinia virus produces mild cowpox but shares antigens with smallpox virus
      2. Smallpox virus is now extinct, due to large-scale, worldwide vaccination efforts
   C. Requirements for a good vaccine:
      1. Effective in producing an immune response against a particular pathogen
      2. Must not produce the actual disease, or any harmful effects
   D. Types of vaccines:
      1. Live, attenuated - a live organism which can replicate but not cause disease
      2. Killed - killed pathogens still have Ag (mostly humoral response)
      3. Toxoid - inactivated toxin, used for diseases where toxin does most of the damage
      4. Current developments: genetically engineered live vaccines, DNA vaccines